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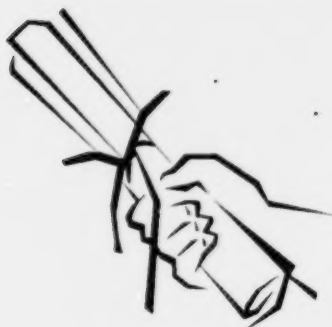
ABSTRACT

This report was prepared for Queensborough Community College/City University of New York, located in Bayside, New York. The report is a summary of national employment statistics and trends in relation to educational attainment. The current economy is driven by jobs that require high levels of knowledge, ease in handling and disseminating information, and skills in technology. According to the Bureau of Labor Statistics, employees with work-related training as their most significant source of education represented 71.3% of employees in 2000. Employees with an associate degree/postsecondary vocational award or higher accounted for less than 30% of total employees during 2000. Employees with less than an associate degree dominated the typically lower-paying fields such as support positions, service occupations, production, operations, and agriculture. Employees with an associate degree/postsecondary vocational award are expected to experience an employment growth rate of 24.1% between 2000-2010, and those with a B.A. degree or higher are expected to experience growth of 21.6%. During this same decade, employees with work-related training are expected to experience growth of only 12.4%. The report discusses the role of the community college in educating the workforce, lists the annual salaries of graduates from selected college programs, and makes recommendations regarding undergraduate job training. (Contains 19 references.) (NB)

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LABOR TRENDS AND EDUCATIONAL ATTAINMENT

FIRST DRAFT

February 2003

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REPORT SUMMARY

PURPOSE OF REPORT

The *LABOR TRENDS AND EDUCATIONAL ATTAINMENT* report was prepared for Queensborough Community College/City University of New York located in Bayside, New York. This report is a summary of national employment statistics and trends in relation to educational attainment.

The various areas of the college, along with other readers of *LABOR TRENDS AND EDUCATIONAL ATTAINMENT*, may secure help in interpreting this collection of information by contacting The Office of Institutional Research and Assessment at Queensborough Community College at 718-631-6279 or cgoldstein@qcc.cuny.edu.

SUMMARY

Our economy is being driven by jobs that require increasingly higher levels of knowledge, ease in handling and disseminating information, and skills in technology. As a result, the U.S. Department of Labor states that the country's employers not only desire a labor pool with skills which meet today's workforce needs, but also the needs of tomorrow's workforce.

Although the majority of current job openings do not require a higher education, employees seeking the best paying jobs or looking for the fastest growing industries will need more than a high school diploma to secure such employment.

The trend in employment is moving toward jobs which require higher levels of education, and increased skills in the use of high technology. Job growth is happening in managerial, professional, technical, healthcare, and education occupations.

In general, employers are stressing the need for stronger skills to meet the demands of today's workplace - such as inter-personal skills, technical expertise, and cognitive abilities. They are seeking workers who exhibit positive attitudes toward their jobs and colleagues, demonstrate strong work ethics including responsibility and dependability, and possess basic reading, writing, math, and computer skills.

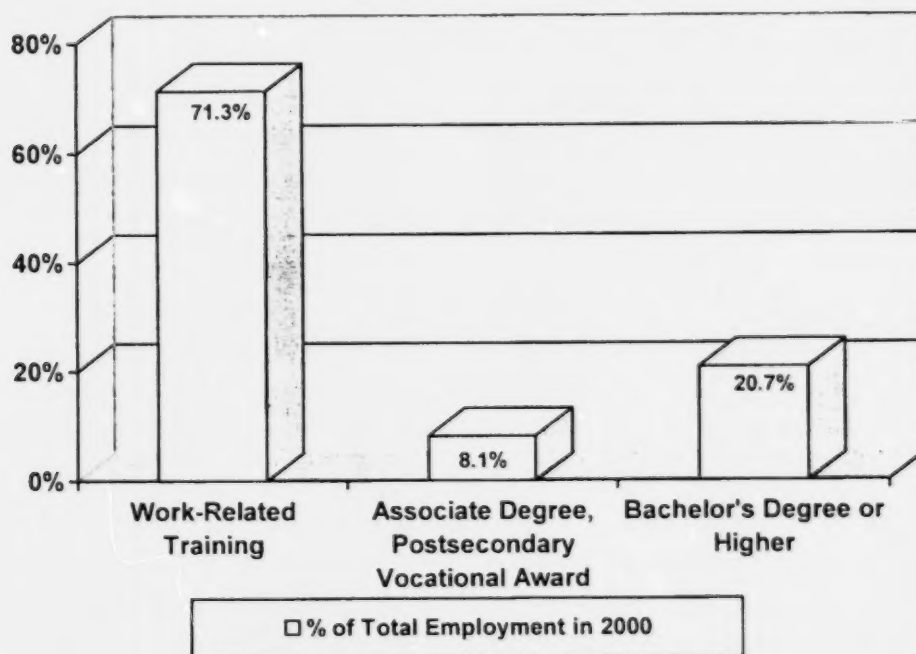
This report will examine educational attainment in the United States, with an emphasis on education's influence on employment, earnings, and student preparation for entering the U.S. labor force. In addition, this report covers the role which community colleges play in today's workforce, and the training students need to fill the gap for qualified workers in the high technology field.



EDUCATIONAL ATTAINMENT AND OCCUPATIONS

According to the Bureau of Labor Statistics, employees with work-related training (work experience and/or on-the-job training) as their most significant source of education or training represented 71.3% of all employees in the year 2000. Employees with an associate degree/postsecondary vocational award or higher as their most significant source of education or training accounted for less than 30% of total employees during the same year.

PERCENT OF TOTAL EMPLOYMENT BY MOST SIGNIFICANT SOURCE OF EDUCATION OR TRAINING, 2000



(Source: U.S. Department of Labor, Bureau of Labor Statistics)

When looking at the breakdown of occupational fields by educational attainment, employees with bachelors and higher degrees are more heavily concentrated in managerial and professional work. Employees with less than an associate degree represent high percentages in the typically lower paying and less degree-oriented fields such as support positions, service occupations, production, operations, and agriculture.

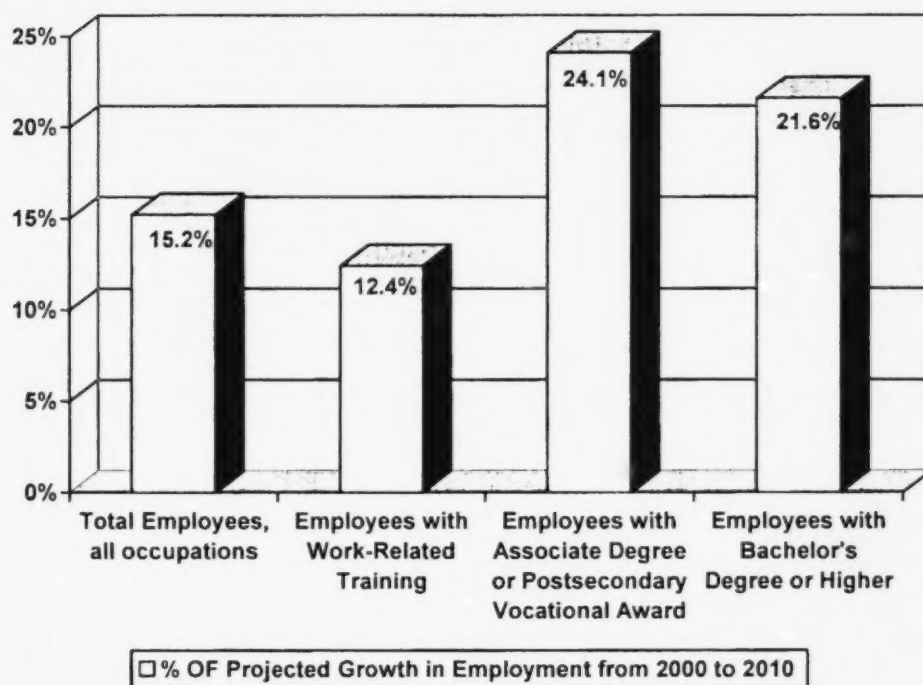
OCCUPATION OF EMPLOYED PERSONS 25 TO 64 YEARS OLD BY EDUCATIONAL ATTAINMENT, 2000

Occupation	Total Employed (in 000's)	Less than high school graduate %	High School Graduate %	Some college, no degree %	Associate degree %	Bachelor's degree %	More than bachelor's degree %
All occupations	110,542	9.7	31.3	18.7	9.4	20.6	10.5
Managerial and professional specialty	37,204	1.5	11.9	13.5	8.9	37.5	26.8
Technical, sales, and administrative support	30,698	4.2	34.4	25.6	12.1	20.0	3.8
Service	12,885	19.7	42.6	20.0	8.5	7.8	1.4
Precision production, craft, and repair	12,915	16.3	46.0	20.1	10.3	6.2	1.1
Operators, fabricators, and laborers	14,363	23.1	50.3	15.9	5.2	4.6	0.8
Farming, forestry, and fishing	2,477	29.6	37.2	14.7	6.6	9.8	2.1

(SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Office of Employment and Unemployment Statistics)

Although employees who have completed formal educational programs represent a much smaller percentage of the employed personnel, they are projected to experience higher growth in employment from 2000 to 2010. Employees with an associate degree/postsecondary vocational award are expected to increase by 24.1% and those with a bachelor's degree or higher are expected to rise by 21.6% during the ten year period ending in 2010. During this same decade, employees with work-related training are expected to grow by only 12.4%; therefore, they will represent just fewer than 70% of employees by 2010.

PROJECTED GROWTH IN EMPLOYMENT BY EDUCATION OR TRAINING CATEGORY, 2000 - 2010



(Source: U.S. Department of Labor, Bureau of Labor Statistics)

The U.S. Department of Labor found that the occupational groups that require the most education are projected to be among the fastest growing careers. Employment in professional specialty occupations is projected to increase the fastest, while technicians and related support occupations will have the second fastest growth rate.

FASTEST GROWING OCCUPATIONS: SELECTIVE LIST JUNE 2000

Computer engineers
Medical assistants
Computer support specialists
Paralegals
Database administrators
Personal care and health aides
Data processing equipment repairs
Physician assistants
Dental hygienists
Residential counselors
Desktop publishing specialists
Securities and financial sales workers
System analysts

(Source: U.S. Department of Labor, Futurework Report)

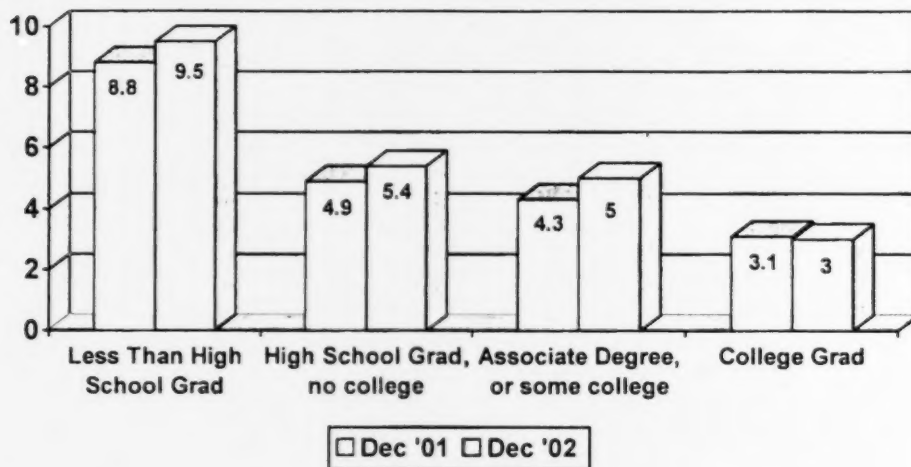
In addition, the National Center for Higher Education Management Systems (NCHEMS) produced a newsletter in June 2000 in which they examined occupational growth rates by the amount of education required and found that:

“Projected growth rate in occupations between 1996 and 2006 indicate that many jobs will require some formal education beyond high school. For example, eighteen of the Department of Labor’s twenty-five occupations with the greatest expected percentage growth rates (as well as high pay and low unemployment rates) require at least a bachelor’s degree. And the twenty highest paying occupations require a bachelor’s degree. Obviously, many of the fastest growing occupations will require some amount of postsecondary education and/or training.”

The table below clearly shows that the higher the educational attainment, the lower the unemployment rate. In December 2002, college graduates have an unemployment rate of 3.0

while employees with varying degrees of lesser education have unemployment rates that range from 5.0 for high school graduates with no college to 9.5 for employees holding less than a bachelor's degree. Those with less than high school diplomas are faced with a striking unemployment rate of 9.5, which is almost double that of high school graduates with no college and three times as high as college graduates. In comparison to December 2001, college graduates were the only group who did not experience an increase in their unemployment rate.

**UNEMPLOYMENT RATE OF CIVILIAN LABOR FORCE 25 YEARS OLD
AND OVER, BY EDUCATIONAL ATTAINMENT (*seasonally adjusted*)**



(Source: News Bureau of Labor Statistics, US. Dept. of Labor)



EDUCATIONAL ATTAINMENT AND EARNINGS

Occupations with the highest earnings also require strong educational credentials. When looking at the 10 occupations with the highest earnings for June 2000, one finds a list consisting solely of physicians and dentists, scientists and engineers, and attorneys.

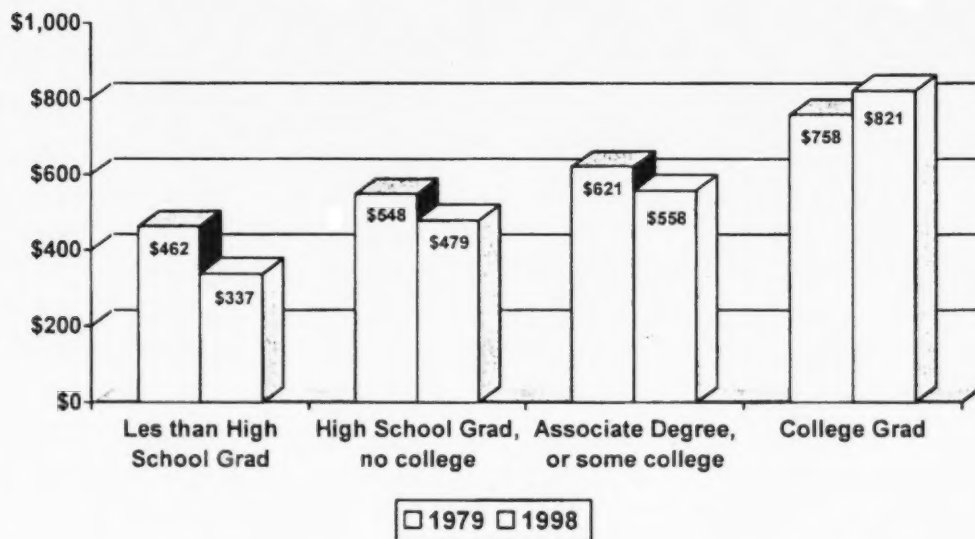
10 OCCUPATIONS WITH THE HIGHEST EARNINGS, JUNE 2000

Physicians
Physicists and astronomers
Dentists
Engineering, natural science, and computer and
information systems managers
Podiatrists
Optometrists
Aircraft pilots and flight engineers
Aerospace engineers
Attorneys
Petroleum engineers

(Source: U.S. Department of Labor, Futurework Report)

It appears that the way to increase earnings is through higher education. The table below shows that, of the four groups compared, only four-year college graduates earned more money in real dollars in 1998 compared to 1979. The other three groups did not keep pace with inflation.

TYPICAL WEEKLY EARNINGS FOR FULL-TIME AGED 25 AND OVER BY EDUCATION IN 1998 DOLLARS



(Source: Department of Labor Futurework Executive Summary)

In July 1997, the U.S. Department of Education collected data from two of its surveys "Recent College Graduates" and "Baccalaureate and Beyond Longitudinal Student, First Follow-up". One year after receiving their degrees, students who graduated with a bachelor's degree in the health professions, engineering, business and management, and mathematics/other sciences are making an average annual salary which is higher than the 1994 total average of \$24,200. Psychology and education majors have the lowest salaries of the 12 majors.

The table below summarizes the average annual salary results, excluding salaries under \$10,000 and over \$500,000, taken from the two surveys. The population surveyed represents full time employees and their field of study in the previous school year.

**AVERAGE ANNUAL SALARY OF BACHELOR'S DEGREE RECIPIENTS
EMPLOYED FULL-TIME 1 YEAR AFTER GRADUATION, BY FIELD OF
STUDY, 1994**

Field of Study	Average Annual Salary of 1992-93 Degree Recipients in April 1994
Total	\$24,200
Health professions	31,300
Engineering	30,900
Business and management	27,100
Mathematics and other sciences	25,400
Biological sciences	22,800
Social sciences	22,100
Public affairs and social services	22,000
Humanities	21,300
History	21,000
Psychology	19,500
Education	19,300
Miscellaneous	21,600

(Source: U.S. Department of Education, National Center for Education Statistics, July 1997)



PREPARING STUDENTS FOR ENTRANCE INTO THE LABOR FORCE

Entering the Labor Force: Need for Education and Training

One of the major concerns of America's employers is whether or not the growing labor force will have the **training** necessary to fill their job openings. According to a report by the U. S. Department of Labor, America faces a skills shortage rather than a worker shortage.

Even though the majority of workers will remain in occupations that do not require a bachelor's degree, the U.S. Department of Labor says that the best jobs will require education and training. The Bureau of Labor Statistics points out that the average job growth rates are expected to be very strong for occupations involving at least an associate degree. The Department of Labor emphasizes that occupations requiring a college degree are growing twice as fast as others; the Department's list of the 20 occupations with the highest earnings indicates that every job on the list requires at least a bachelor's degree.

Skills Necessary for Employment

According to the U. S. Bureau of Labor, more jobs now and in the future will require verbal and mathematical skills, as well as organizational and interpersonal skills, and high technology skills. Employers are seeking job applicants with cognitive and communication skills, and educational credentials.

Basic and Advanced Skills Necessary for Employment

The American Management Association performs an annual survey of mid-size and larger businesses in relation to the match-up between job candidates' skills and those skills required by employers. According to the 1999 survey results, 38% of the job applicants taking employer-administered tests lacked the math and reading skills necessary for the jobs for which they were applying. Two years earlier in 1997, only 22% lacked the math and reading skills. The American Management Association attributes this dramatic increase in unqualified job applicants to the higher skill levels required in today's digital workplace. As the level of required on-the-job skills has increased, the skills of the labor pool have not accelerated at the same pace.

In addition, a 1999 report by the Business-Higher Education Forum found that graduates lacked skills in problem solving, time management, analytical thinking, and basic writing and speaking.

NCHEMS Study Results

The National Center for Higher Education Management Systems (NCHEMS) produced a newsletter in June 2000 describing the results of an employer survey they conducted to determine the types of knowledge and skills employers will be looking for in their future employees, including recent college graduates. The following is a summary of the study's results.

According to the NCHEMS study, employers need employees with basic workplace skills—being able to read simple documents, knowing how to present oneself in an interview, and having a good work ethic (showing up on time and completing tasks). Employers complained about the lack of these skills among all employee educational levels, from a high school diploma or less to bachelor's degrees and higher.

NCHEMS reported that when an employee cannot communicate adequately, either orally or in writing, they tend to be ineffective when working with co-workers and customers. Employers also expressed concern about "people skills"—teamwork, managing others, resolving conflict, and responding to customers.

NCHEMS says that employers want employees who are capable of working in teams, able to switch between taking leadership positions and serving in support roles, analyzing customer problems which include creating solutions with fellow team members, and communicating solutions to the customer.

Mostly comprised of personnel directors and CEO's, the employers interviewed identified the following knowledge, skills, and attitudes necessary for success in the 21st Century workforce:

Overall Attitudes and Personal Characteristics Necessary for Employment

- Adaptability/flexibility/resiliency/ability to accept ambiguity
- Common sense and ability to anticipate consequences
- Creativity
- Empathy
- Positive attitude/good work ethic/ability to self manage
- Reliability and dependability
- Responsibility/honesty/integrity

Essential Skills Necessary for Entry Level Employment

- Computer skills for simple tasks (word processing)
- Interpersonal skills/team skills
- Numeric and computation skills at a ninth-grade level
- Reading at a ninth-grade level
- Speaking and listening
- Writing

Integrative-Applied Skills Used in More Complex Situations

- Application of technology to tasks
- Critical thinking
- Customer contact skills
- Information use skills
- Presentation skills
- Problem-recognition/definition/solution formulation
- Reasoning

Premium Skills, not mandatory but important additions

- Ability to understand organizational and contextual issues (legal, environmental)
- Basic resource management, budgets
- Ethics
- Foreign language fluency
- Globalism, international skills (understanding international systems and their implications for business)
- "Multicultural" competence skills (a familiarity with how different nations operate and interact as well as an openness to new cultures)
- Negotiation skills
- Project management and supervision
- Systems thinking

Recommendations for Preparing Undergraduates for Labor Force

Employers' comments on the skills of recent graduates include these frequently heard examples: "Many recent graduates cannot communicate effectively (in writing or orally)"; "Cannot solve real world 'messy' problems"; and "Have difficulty working in teams".

In conclusion, NCHEMS makes the following recommendations to colleges for training their undergraduates as they join the workforce.

Recommendations for Undergraduate Training

- Have students write more
- Teach students to construct strong sentences
- Teach students how to write in different contexts, such as memos for their boss or colleagues
- Train students to write under tight time constraints in which they cannot re-read and revise their work.
- Expose students to solving and identifying real world "messy" problems. NCHEMS said that many of the employers interviewed are "quite satisfied with recent college graduates' abilities to solve problems; it is finding the right problem to solve that stumps many graduates."



THE ROLE OF COMMUNITY COLLEGES IN EDUCATING TODAY'S WORKFORCE

Demographic and economic drivers are redefining the modern role of community colleges. In 'Community Colleges and Career Qualifications', Anthony Carnevale outlines five crucial roles that community colleges will play in the new economy and in the new multicultural America:

- The minimum educational qualification for access to good jobs
- The stepping stone to bachelor's and graduate degrees
- The pivotal education institution in the nation's job training and retraining system
- The primary education provider for the least advantaged
- The first chance at American higher education for the surging immigrant population

Community colleges offer the opportunity for higher education to many students who would never have entered college without the benefit of the "open" admissions policy of two-year colleges. Students requiring additional academic help are offered remedial programs. This student benefit translates into an educational challenge for community colleges, i.e. how will they handle students who are academically unprepared or under-prepared.

Community colleges now offer a wide variety of college programs to meet the ever-changing needs of the U.S. workplace. The following list of popular community college programs is almost exclusively concentrated in high technology and health care areas.

SELECTED COMMUNITY COLLEGE PROGRAMS* AND AVERAGE ANNUAL SALARY, 1997

College Programs	Average Starting Salary
Digital systems	\$35,000
Facilities technology/maintenance	\$32,000
Dental hygiene	\$31,750
Manufacturing process technology	\$30,675
Telecommunications/information specialists	\$29,267
Registered nurse	\$28,777
Personal computer certificate	\$28,775
Computer science	\$28,400
Computer programming	\$28,066
Multimedia technology	\$27,666
Occupational therapy assistant	\$27,624
Physical therapy assistant	\$27,564
Robotics	\$27,500
Fuel technology	\$27,000
Computer assisted design	\$26,891
Respiratory therapy	\$26,877
Trailer/truck driving	\$26,750
Engineering	\$26,432
Radiology technology	\$26,090
Chemical technology	\$26,000

*based on administrators' impressions of what programs were "hot" at their colleges and reported starting salary of graduates

(Source: Educational Testing Service, "The American Community College Turns 100")

In 1994, the U.S. Department of Education presented the statistics on the literacy skills of adults based on its study, "Adults Literacy in America, 1992." They chose three areas of literacy and showed the percent of students who fell into the highest, moderate, and lowest levels of literacy after completing specific exercises. The three areas of literacy are defined as:

- Prose – able to understand and use information contained in various kinds of textual material
- Document – has knowledge and skills used to process information from documents
- Quantitative – able to perform numerical operations in everyday life

In all three literacy categories, adults with an associate degree had average scores which were higher than the total averages. As indicated in the table below, as the level of education rises so do the average literacy scores.

LITERACY SKILLS OF ADULTS, 16 YEARS OLD AND OVER, 1992

(Literacy scores run from a low of 0 to a high of 500)

Highest Level of Education	Prose Literacy, Average Score	Document Literacy, Average Score	Quantitative Literacy, Average Score
Total	300	293	299
GED	268	264	268
High school diploma	270	264	270
Some college	294	290	295
Associate degree	308	299	307
Bachelor's degree	322	314	322
Graduate studies/degree	336	326	334

(Source: U.S. Department of Education, National Center for Education Statistics, 1994)

In 2000, 9.4% of employed persons had an associate degree as their highest level of educational attainment. Over 60% of those with associate degrees who were employed in 2000 were concentrated into four occupational areas - administrative support/clerical (17.2%), professional specialty occupations (16.1%), executive/administrative/managerial positions (15.7%), and precision production/craft/repair (12.8%). The remainder is spread out through service, sales, and technical support occupations, with a very small percentage found in farming/forestry/fishing.

EMPLOYED PERSONS 25 to 64 YEARS OLD WITH ASSOCIATE DEGREE BY OCCUPATION, 2000

Occupation	Total Employed (in 000's)	Total Employed with Associate Degree	% of Total Employed with Associate Degree
All Occupational Groups	110,542	10,391	100%
Administrative support, including clerical	14,887	1,786	17.2
Professional specialty occupations	19,041	1,676	16.1
Executive, administrative, and managerial	18,162	1,635	15.7
Precision production, craft, and repair	12,915	1,330	12.8
Service occupations	12,885	1,095	10.5
Sales occupations	12,051	1,036	10.0
Technicians and related support	3,761	888	8.5
Operators, fabricators, and laborers	14,363	747	7.2
Farming, forestry, and fishing	2,477	163	1.6

(Source: U.S. Department of Labor, Bureau of Labor Statistics, Office of Employment & Unemployment Statistics, and Current Population Survey; April 2001)



TRAINING STUDENTS FOR HIGH TECHNOLOGY JOBS

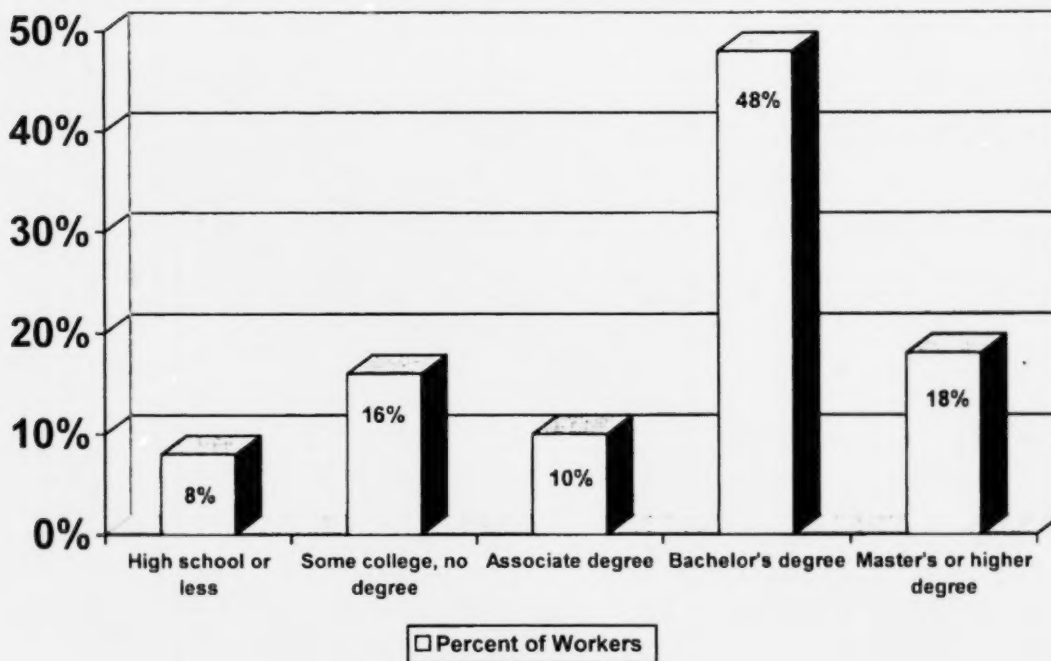
Influence of Technology on the Workforce

Technology is significantly influencing the job market. We see it in the continually increased use of computers and the Internet in the workplace, the creation of high-skilled jobs, and the U.S. Department of Labor's projection for decreased demand for low-skilled jobs.

High technology jobs offer higher average job pay than non-high technology jobs, and have the ability to remove barriers in the workplace for employees with disabilities.

Information technology (IT) employees possess a wide range of training and qualifications including on-the-job training, non-high technology degrees, and high technology certificates and degrees. Almost half of IT workers have a bachelor's degree; however, it is not necessarily in a technology major. More workers have some college with no degree (16%) than those who have associate degrees (10%). The Occupational Outlook Quarterly's report "Training for Techies: Career Preparation in Information Technology" suggests that "many people attend community colleges not to earn degrees but to take computer-related courses in hopes of getting a job or as a way to retrain and update their skills."

**DISTRIBUTION OF WORKERS IN COMPUTER-RELATED
OCCUPATIONS BY HIGHEST LEVEL OF EDUCATIONAL
ATTAINMENT, 2001**



(Source: The Occupational Outlook Quarterly's report "Training for Techies: Career Preparation in Information Technology")

Information technology jobs are projected to be among the fastest growing occupations between 1996 and 2006. Information technology occupations include database administrators, computer support specialists, and all other computer scientists, computer engineers, and systems analysts. Jobs for systems analysts, computer engineers, and database administrators/computer support specialists/all other computer scientists show astronomical increases of over 100%. In comparison, computer programmer jobs are expected to experience a rise of less than 25%.

PROJECTED GROWTH IN INFORMATION TECHNOLOGY OCCUPATIONS, 1996 – 2006

Occupation	1996 Employment	2006 Projected Employment	Projected Change 1996 - 2006
Computer programmers	568,000	697,000	23.0%
Systems analysts	506,000	1,025,000	103.0%
Computer engineers	216,000	451,000	109.0%
Database administrators, computer support specialists, and all other computer scientists	212,000	461,000	118.0%

(Source: U.S. Department of Labor, Bureau of Labor Statistics)

Shortage of IT Workers

Throughout the current information technology literature, it is being reported that U.S. employers are struggling to recruit and retain enough high technology workers to meet the demand. In 1999 there were 2.1 million people employed in core technology jobs. In the same year, ABC News covered a report issued by the Commerce Department which says that "if current trends continue, the U.S. will need another 1.3 million skilled technology workers by the year 2006." Currently, there is a strong demand for employees who have skills in the newest programming languages, who have knowledge of network related software, and who have the ability to work with World Wide Web applications.

Suggestions for Expanding the Existing IT Workforce

The U.S Department of Commerce suggests that schools and companies who employ high technology workers work more closely together to expand the number of qualified information technology employees. The Department of Commerce would like to see flexible school curriculums, particularly among community colleges, which can respond quickly to industry needs by teaching required on-the-job skills, and to see employers put an emphasis on training current and non-traditional workers.

The report, "Building the 21st Century Information Technology Work Force," encourages schools and information technology employers to encourage non-traditional employees to enter the hi-tech field.

Non-traditional employees include:

- Women
- Minorities, such as African Americans and Hispanics
- Mid-career and older technical professionals, such as engineers who were dislocated during defense and corporate downsizing
- People from non high technology backgrounds
- Workers with disabilities

The report continues to suggest steps for educational institutions to increase the number of non-traditional students in information technology.

**Steps for Educational Institutions to Increase the Number of Non-Traditional Students
in Information Technology**

- Stay up-to-date on occupational developments and the skills employers require to meet their information technology needs
- Engage underrepresented groups in math and science in the classroom and through career counseling
- Use current information technology women and minorities as role models
- Develop strong recruiting relationships with high technology companies for internships and jobs
- Offer high technology companies programs to up-date the technology skills of their current workforce
- Provide job search skills to non-traditional information technology students

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